Let's build: D.I.Y. Heaters

step by step instructions

Some random Anarchists from the Pacific Northwest have been building and distributing copper coil tent heaters to our friends who live outside.

This step-by-step DIY tutorial is based on HeaterBloc's original instructions with some modifications we've found helpful.

Please feel free to print and distribute this zine.

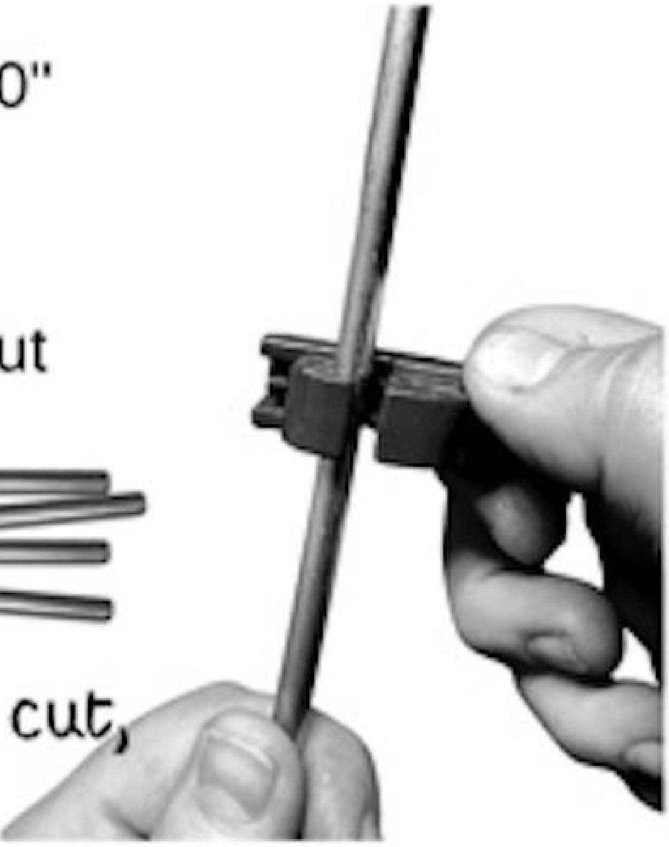
1st Step Cutting Copper

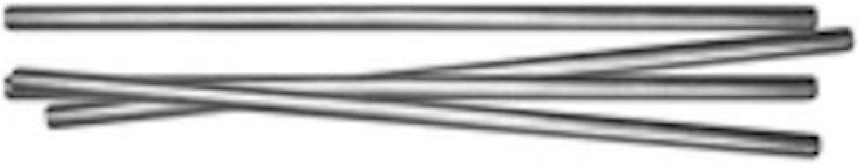
You will need:

- A pipe cutter that cuts 1/8" - 5/8" (Whatever is best for 1/4" otherwise it can pinch easily)
- 10' of refrigerant grade copper tubing that is 1/4" diameter
- Tape measure or ruler
- Sharpie for marking

Instructions:

1. Measure out your 10" sections of copper
2. Mark with Sharpie
3. Use pipe cutter to cut





Once all sections are cut, move onto step two.

2nd Step Fill the Copper Tubes With Salt

***This will keep the tubes from pinching at any point while you're bending them into coils.*

You will need:

- Salt
- Masking tape
- Funnel (preferably small for 1/4" copper)
- Cups to hold the salt

Instructions:

1. Use Masking tape to cover one end of each segment of copper
2. **Completely fill** each segment of copper with salt
3. Use Masking tape to cover the other end of the copper tube.

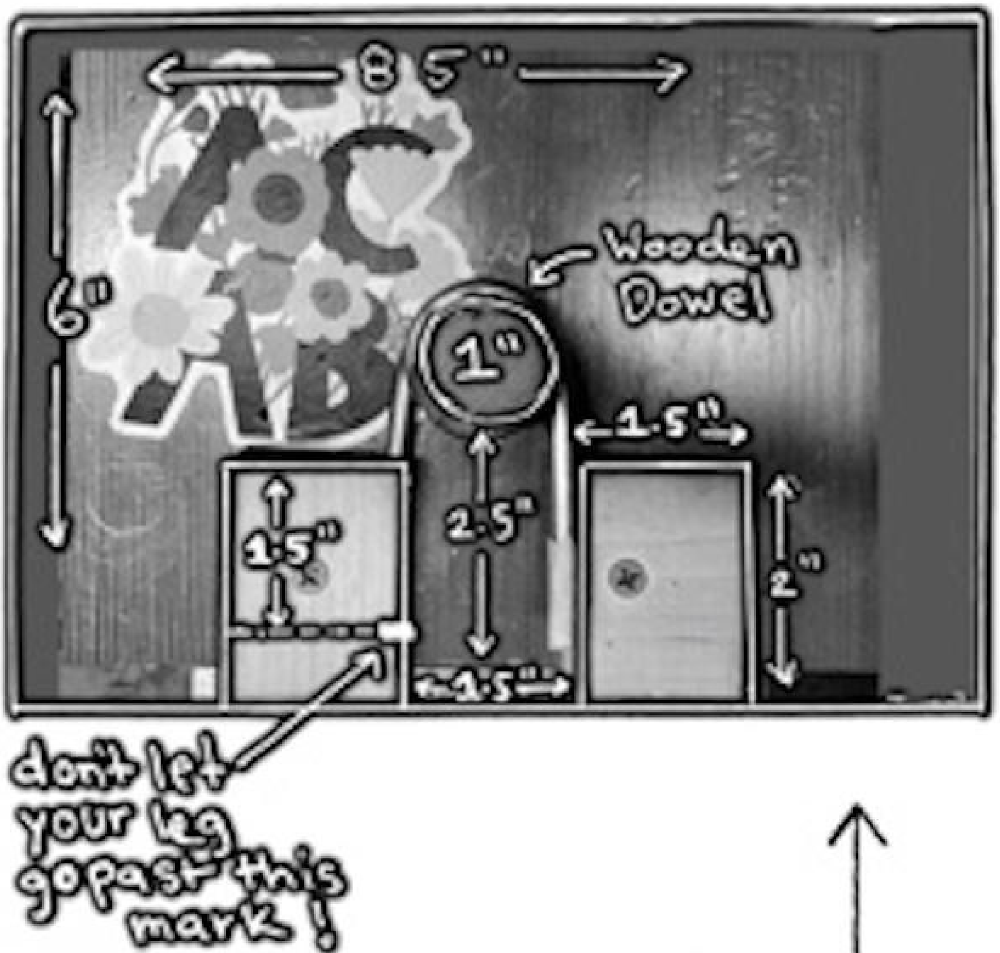
3rd Step Bending the Coils

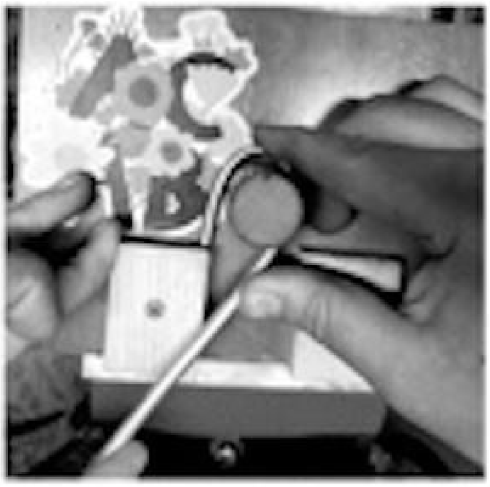
You will need:

- Jig (You can also just use a 1" dowel if you don't want to make a jig)
- Clamps to hold the jig to the table

Instructions:

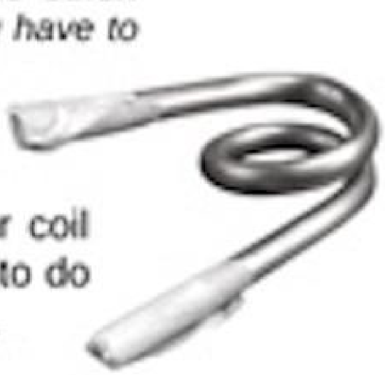
1. Put one end of the coil against the left block and brace it so it stays put.
2. Bend copper around the dowel **twice** so that the second end is up against the right block





** If you're making a Jig, here's a rough diagram of what that might look like.

** This one was made for 12" coils so adjust measurements of your jig construction accordingly, OR make sure to mark the left block 1/2" from the bottom and use this as a guide so you don't end up with one leg shorter than the other. *(which can sometimes mean you have to scrap the whole coil)*



** Make sure the loops of your coil aren't touching, you may have to do a little prying to pull them apart.

4th Step Clearing Salt From the Coils

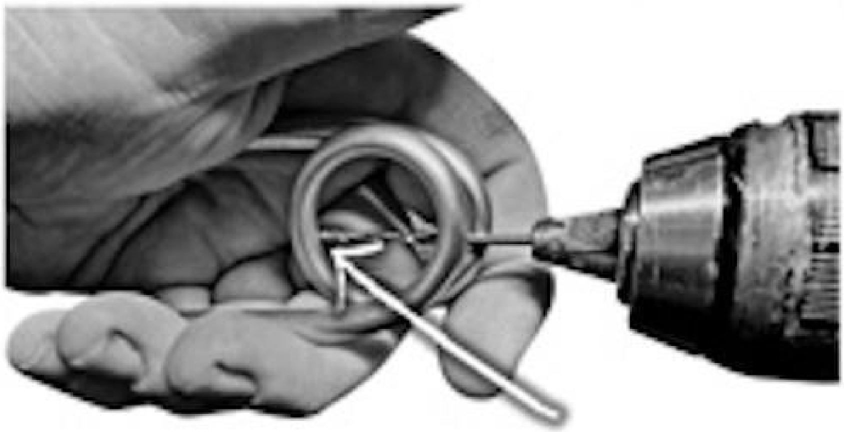
You will need:

- Canned air *(or an air compressor)*

Instructions:

1. Remove tape and pour salt out of the copper coils into a container to the best of your ability. *(Tapping on a hard surface helps loosen up bits that are stuck in the coil.)*
2. Use compressed air to blow out the remaining salt

5th Step Drilling Fume Holes



You will need:

- Drill
- 5/64" bit

Instructions:

Drill one fume hole at the center of the base of the coil.

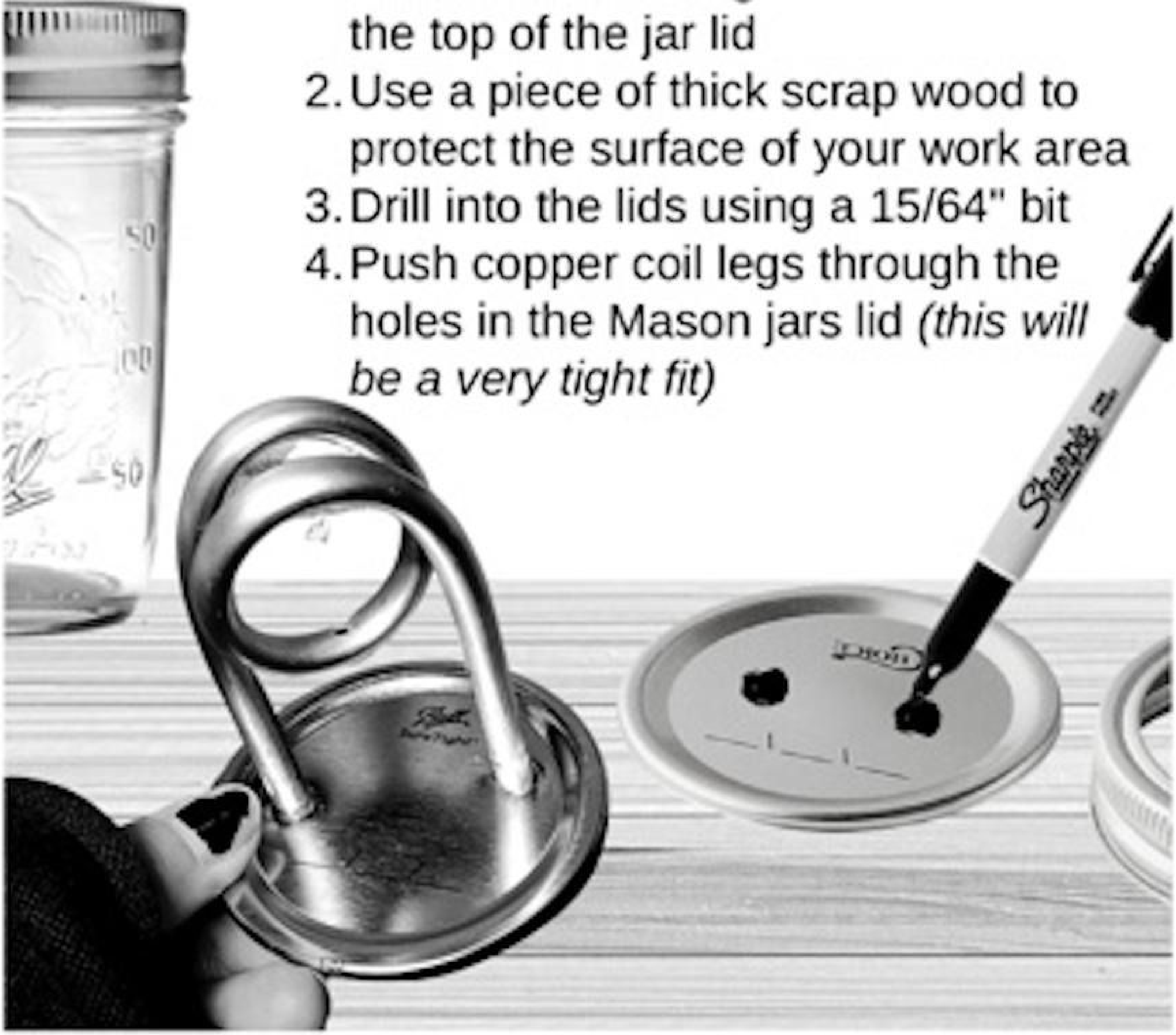
6th Step Drilling Lid Holes

You will need:

- A 15/64" bit
- Wood scraps *(to protect your table while drilling holes in lids)*
- 8oz Mason jars

Instructions:

1. Mark where the legs of the coil meet the top of the jar lid
2. Use a piece of thick scrap wood to protect the surface of your work area
3. Drill into the lids using a 15/64" bit
4. Push copper coil legs through the holes in the Mason jars lid *(this will be a very tight fit)*

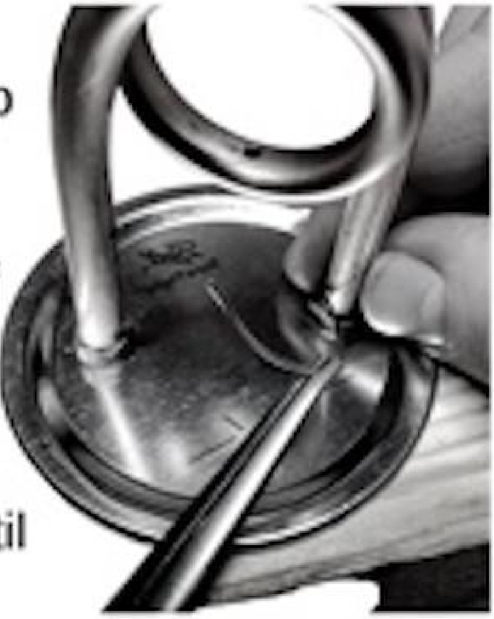


7th Step Soldering

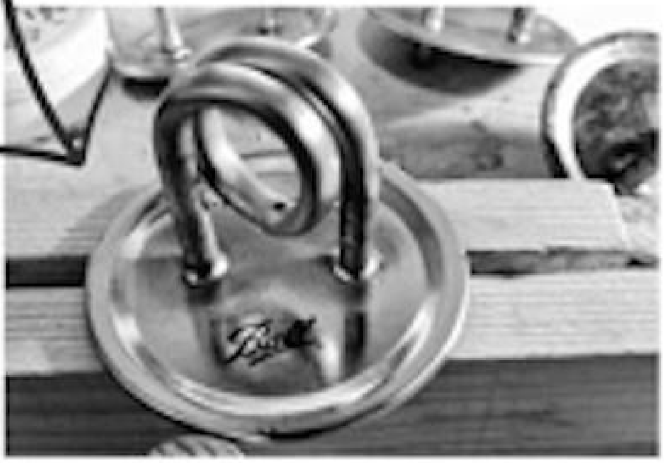
You will need:

- A butane Torch & butane
- Rosin based solder *(solder for metal is ideal)*
- Two pieces of scrap wood for a base

Instructions:



1. Cut two 3" pieces of solder and wrap solder around the base of each leg where they connect with the lid
2. Rest the coil/lid on the two pieces of wood so that the legs of the coil are between the pieces of wood
3. Use the butane torch to heat up the middle part of the legs of the coil until the solder begins to melt



DON'T AIM THE TORCH DIRECTLY AT THE LID OR THE SOLDER THOUGH!
BURNING THE RUBBER SEAL ON THE INSIDE OF THE LID WILL MAKE THE HEATER NON-FUNCTIONAL.

8th Step Wicks

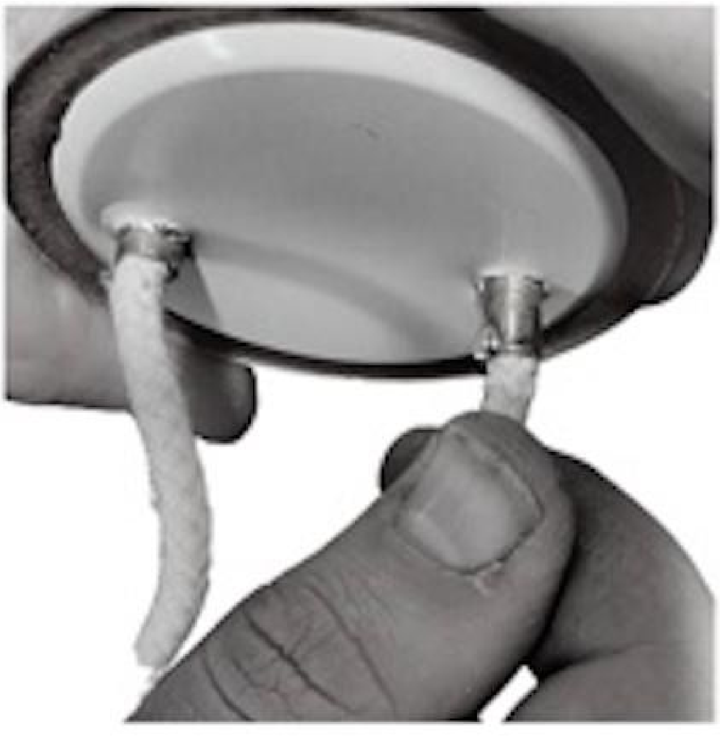
You will need:

- 1/4" circumference cotton wick *(We use 50ft rolls)*
- Scissors

Instructions:

1. Cut wicks into 6" pieces
1. Feed the wicks into the coils.

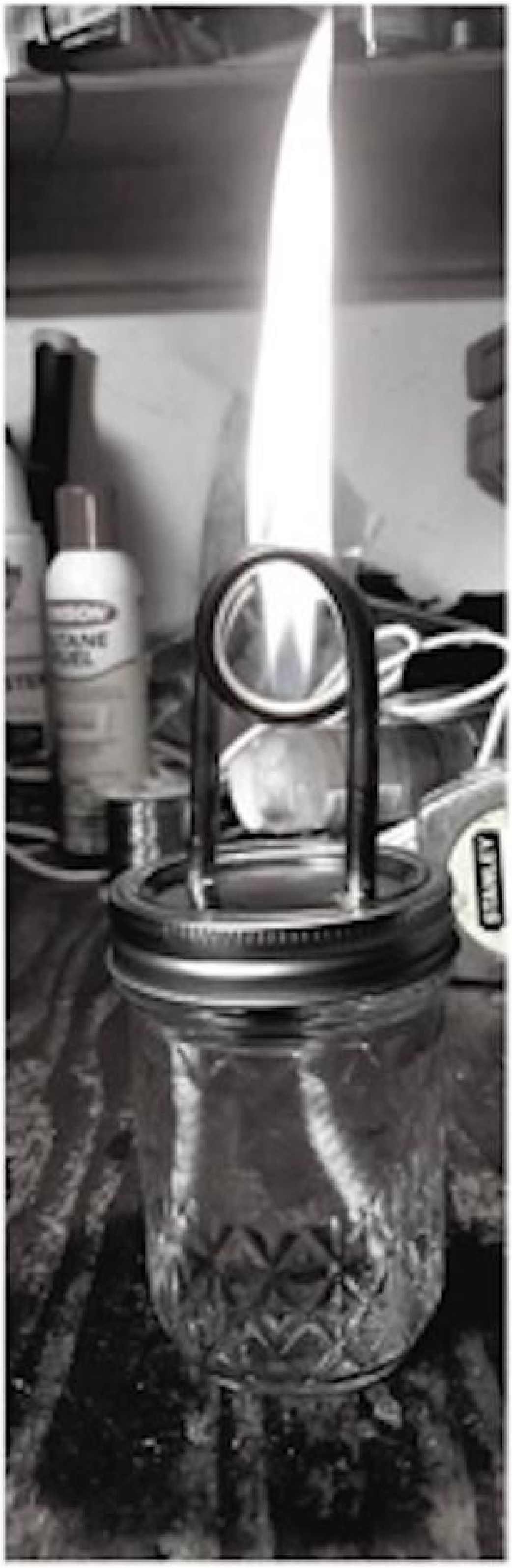
This is a tight squeeze! We use a center punch or needle nose plier tips to help get the wicks into the tubes **then twist the wicks while feeding them through the coil.**



9th Step Test the Heaters

You will need:

- Fuel (**91 % or higher,** Isopropyl)
- A butane torch + butane



Instructions:

1. Assemble all the pieces of the core
2. Pour in 91% Isopropyl
3. Screw on lid
4. Use Torch to heat up both sides of the coil equally **until the flame comes and is steady for about five minutes**

***If the flame is weak or doesn't grow, check again for holes in the solder and adjust wicks by pushing them higher or bringing them lower. (This is your main cause for the core to not be functional)*

****Also, the bends play a huge role. If the bend isn't smooth then the gasses can't circulate properly and your heater won't work.*

10th Step Wire Cages

You will need:

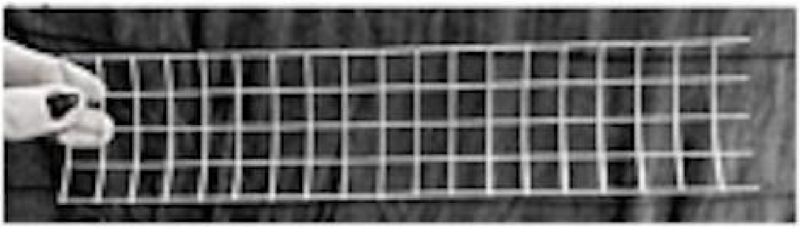
- Wire cutters
- Needle nose pliers
- Welded wire mesh with 1/2" x 1/2" sq

Cage dimensions:

— Large cage, 20 squares tall x 35 wide

— Smaller cage, 4 squares tall x 19 wide

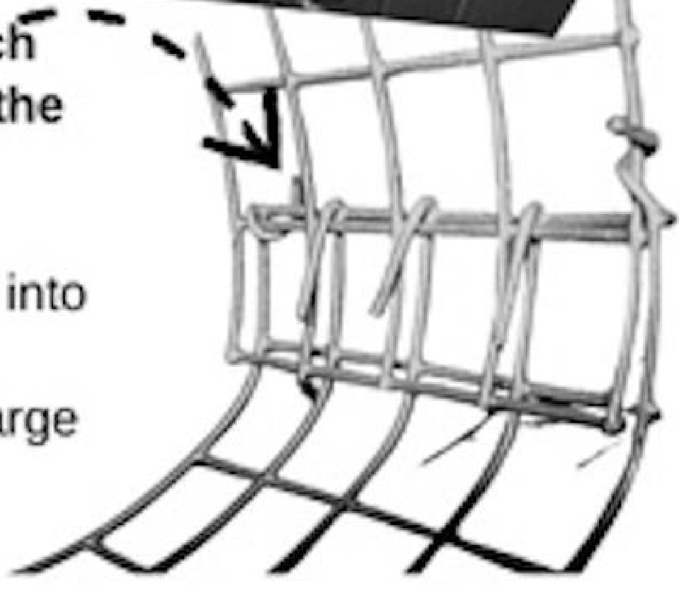
***The last square is left open for bending on the width side. So in the large the 35th row of squares is left open and on the small the 19th is*



***Try to always use the curve of the wire bundle for your width. Going against the curve can be a total pain.*

Instructions:

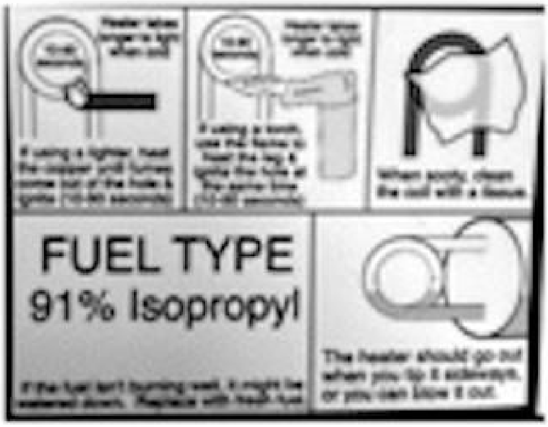
- Cut the wire according to the dimensions above, leaving one open ended row of squares.
- Bend your circle at the width
- **Use the open squares to latch onto the closed squares on the opposite side** of your bend, creating a cylindrical cage.
- Test by fitting your Mason jars into the smallest ones and the Terracotta pots on top of the large ones to ensure a snug fit.

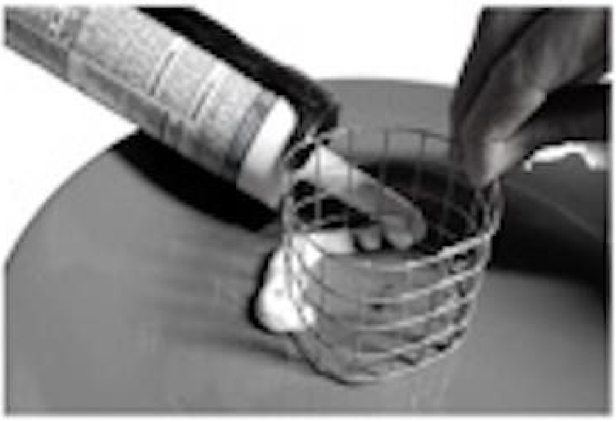


11th Step
Caulking

You will need:

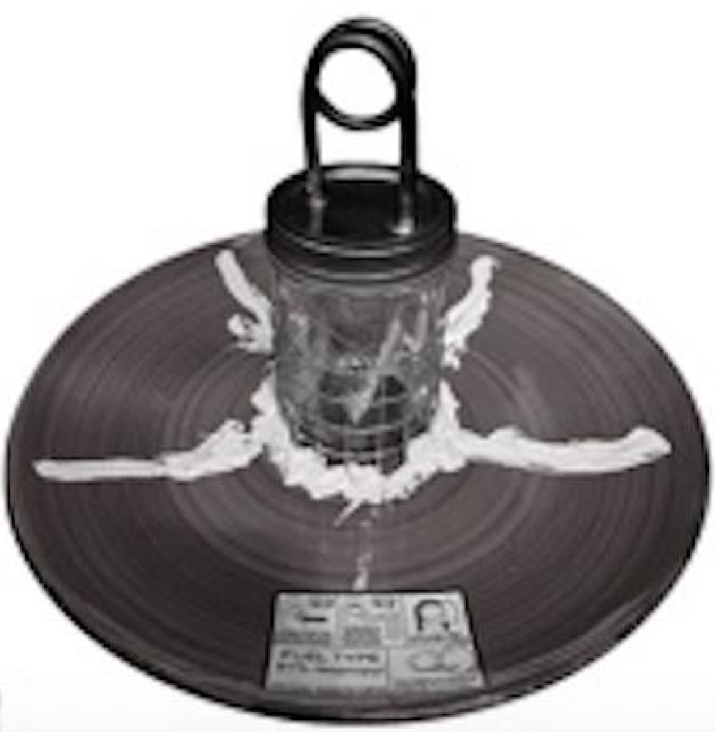
- Instructional stickers that clearly state the fuel type; 90% isopropyl or higher (*You can create your own or contact @nightowl_custom on socials to get some of their stickers*)
- Weather resistant silicone caulking
- and caulking guns
- Plates, large, ceramic and flat without lips or ridges that will interfere with the wire cages staying level
- Small wire cage





Instructions:

1. Apply caulking around small cage securing it to the center of the plate (*this will hold the jar in place*)
2. Place instructional sticker on the outer rim of the plate
3. Let dry (*24 hours if possible, it can take a while if it's cold*)

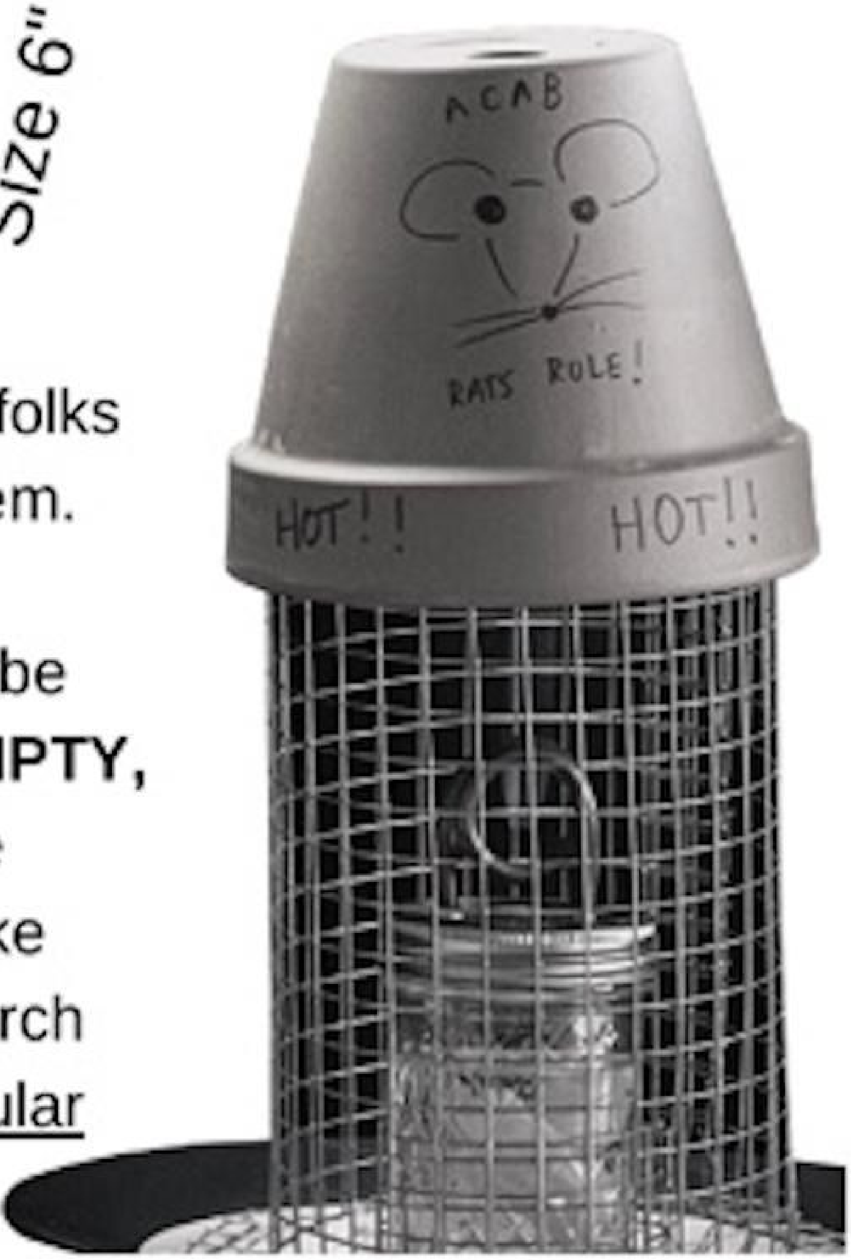


12th Step

Terracotta Pots

It's pretty rad when folks draw designs on them.

All Heaters need to be distributed while **EMPTY**, with fuel in separate containers, and make sure to include a Torch lighter because regular lighters won't work.



Some notes on safety:

- Please make sure the heater is not near anything flammable (tarps, clothing, bedding or propane tanks)
- Allow for proper ventilation to avoid carbon monoxide poisoning
- 91% isopropyl alcohol is the cleanest burning fuel we've used and anything lower than 91% has been known to create more soot (which will increase the risk of fire) as well as more harmful fumes/particulates in the air causing nausea and headaches
- In extreme cold weather there is a possibility that the glass jar can crack. (The flame should go out if this happens, or if the jar were to tip over, but it would be a good idea to have a fire extinguisher on hand just in case.)
- Soldering instead of using J-B Weld is a more durable and heat resistant way to create a seal where the copper coil and the lid meet. The seals are less likely to leak or degrade over time.

Stay safe, stay warm! <3

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